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The Future of Carrier Aviation

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IN EARLY 1992 IT HAD BEEN PREDICTED that the axe would fall on the Navy budget, as on those of the other services, when President Bush unveiled his proposal for the fiscal 1993 (FY 1993) federal budget in his January 1992 State of the Union Address. An announcement that the Navy would be forced to pare down to nine or ten deployable carriers would have surprised no one and would have been consistent with reductions in the Army and Air Force. Although naval leadership held firm to a "party-line" commitment of twelve carriers, very few staff officers working on the new budget believed that a dozen carriers were realistically affordable. Having committed themselves to twelve carriers, those running the Navy would not be at fault if the base force structure were significantly altered to the detriment of the service. Yet to the surprise (and dismay) of many, the administration spared further cuts to the carrier force, citing it as pivotal for the roles of forward presence and crisis response. Not only was the carrier force to be maintained at a total of twelve deployable carriers with twelve active air wings, but long-lead money for an additional nuclear carrier for the distant future, CVN 76, was included in the president's FY 1993 budget with construction beginning in 1995. Instead of the carrier fleet, the Seawolf submarine program became the prime target for saving money.

As was expected, the Department of the Navy budget was reduced $7.9 billion from what had been requested, for a total of $84.6 billion (in the president's budget proposal), with the presentiment that another ten percent could vanish before the process ended.[1] As a result, budget analysts have undoubtedly worked feverishly to determine how the Navy would accomplish, with 461 ships, nearly the same number of personnel as in 1991 (in fact a two-percent decrease), and drastically less money ($101 billion in FY 1991), tasks essentially unchanged from previous years. Harlan Ullman's model (Table 1) for contrasting budgets against

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Table 1
Approximate Combat Force Levels for a Given Budget

Navy Budget (FY 91 $)	Nominal CVBG	Amphibious Ships	Submarines (SSN/Trident)	Surface Combatants	Total Ships
$45 billion	4-5	10-15	40-45	55-60	250
$55 billion	5-6	25-30	45-50	65-70	300
$65 billion	7-8	25-30	55-60	75-80	350
$75 billion	8-9	40-45	60-65	90-95	425
$85 billion	10-11	40-45	65-70	110-115	480

Source: Harlan K. Ullman, *In Harm's Way*, Bartelby Press, 1991, p. 160.

force size approximates the dilemma the Navy currently faces trying to pay for more than is realistically affordable. As the Navy has discovered, twelve carriers and as many air wings are an extreme challenge to fund with an annual budget of roughly $85 billion, one that is in all probability higher than future budgets will be.

Accomplishing the fiscally impossible has occupied the time and talent of many individuals. The scramble to shuffle dollars between programs is akin to rearranging deck furniture on the *Titanic*, for regardless of appearances, to attempt to pay for more than is affordable is to remain on a collision course with the inevitable. Since the Navy's near-term reduction in personnel is relatively insignificant (19,500 personnel in FY 1992) and deployable assets are only slightly fewer than the previous year (464 deployable ships in FY 1992 compared to 461 in 1993), cost reductions must be found somewhere else without delay.[2] Readiness and training being intrinsically tied to the morale of personnel, it is unlikely that operations and support funds will be candidates for reduction. The real question is, what program or programs can fall victim to the reality of fewer dollars without creating the dreaded "hollow force"?

Peripheral programs exist within naval aviation which, although not costly individually, are collectively attractive for needed cuts and are traditionally the first to go. Programs such as advanced weaponry and training ordnance are "quick fixes" seized upon to ease the initial crunch, for they can be terminated relatively rapidly without cancelling major programs. A prime example was the recent curtailment of the Advanced Air-to-Air Missile (AAAM), which would have improved the ability of the FA-18 E/F (an advanced FA-18) to substitute for the F-14 in the "outer air battle" mission. The AAAM was terminated as a cost-saving measure, yet the FA-18 E/F program is still proceeding as planned even without this major component critical to the future employment of the aircraft.

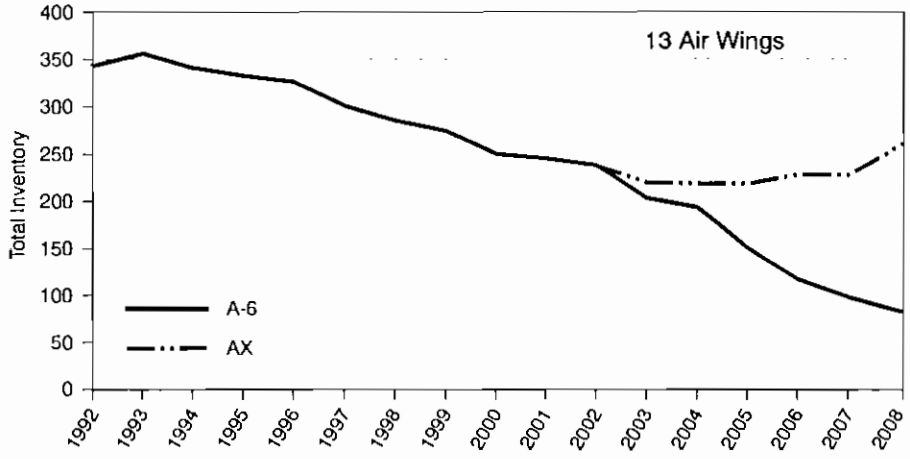
As windfalls of a few billion dollars here and there are patched together from a variety of smaller programs, the net effect is the loss of training or war-waging capabilities in the future. The "hollow force" is not avoided at all—it is in fact *created* by such an approach. Savings available from cutting weaponry advances and training ordnance for aircrew offset merely the tip of the iceberg of present funding shortfalls. The major problem in the coming decade will be the difficulty of fielding enough properly outfitted and competently manned aircraft to fill the decks of the dozen deployable carriers.

The Aircraft-to-Carrier Disconnect

The prime example of a mismatch between ends and means exists in connection with procurement of enough aircraft to fill the Navy's current eleven active and two reserve carrier air wings. Simply stated, the Navy procured the bulk of its current aircraft during the 1980s; consequently, a large number of aircraft will meet the end of their useful lives in the mid to late 1990s. It has been estimated that 5,000 aircraft Navy-wide will need replacement due to aging over the next twenty years.[3]

To fulfill the needs of a set number of air wings, the Navy must procure a certain number of aircraft per year. This figure is predicated on aircraft age and estimated losses to accidents. Accordingly, the fiscal 1993 budget has earmarked $6.7 billion for procurement of 127 aircraft, both Navy and Marine, not all of them bound for carriers. It is estimated, however, that 210 Navy aircraft are needed in that year to meet total projected needs. This same dilemma has already existed for the last few years, in which procurement has been only about half of that needed to fulfill future requirements.[4] Figures 1, 2, and 3 compare the predicted annual inventories of A-6 (to include AX procurement for eventual replacement of the A-6, which is no longer in production), F-14, and FA-18 aircraft, respectively, and those required for thirteen total carrier air wings (eleven active and two reserve). It is obvious that the downward trend for each type of aircraft will produce a dramatic void if funding for aircraft procurement does not change. Figure 4 shows the cumulative effect of aircraft shortages for future years.

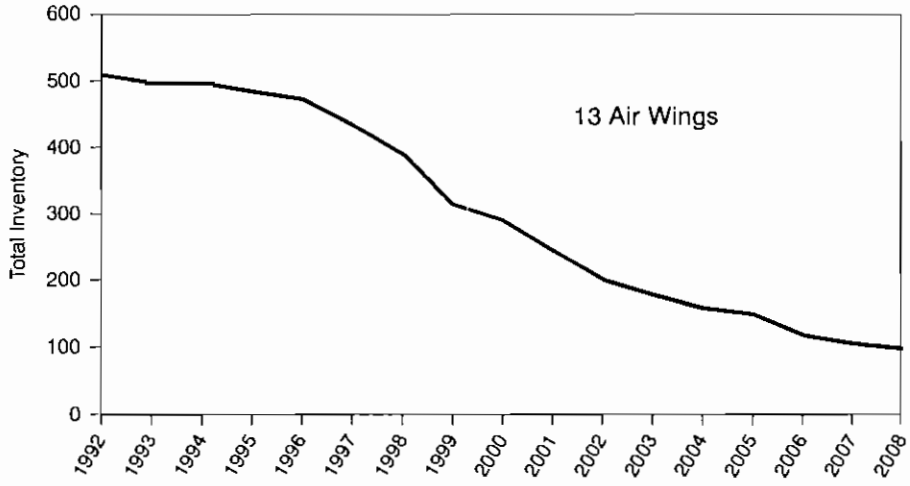
Does naval aviation merit additional funding? Has it received its fair share to fill carrier decks in the future, or is there a disconnect somewhere in the aircraft procurement process? The former Assistant Chief of Naval Operations, Vice Admiral Richard M. Dunleavey, said recently, "The truth is that naval aviation has received its fair share for the past five years at least (87-91), and—as far ahead as the budget is currently projected in the Five Year Defense Plan—receives more than either the submarine or surface community. . . . It is hard to justify naval aviation getting an even larger slice of the pie."[5]



A-6E / AX Inventory vs. Requirements

Figure 1

Source (Figures 1-4): OP-05, 1991 estimates of aircraft requirements



F-14 Inventory vs. Requirements

Figure 2

A look into the future shows that the aircraft procurement account averages over nine percent of the Navy's "Total Obligated Authority" between 1993 and 1997, a figure not likely to climb significantly.[6] If decreased funding trends continue, as it appears they will, the main issue for the Navy will not be the number of deployable carriers but whether sufficient aircraft will be available at all to fill their decks. Under these circumstances, it is imperative to focus not on past funding levels but on how the money has been spent and how it *should* be spent in future years.

Aircraft Modernization: A Decade of Frustration

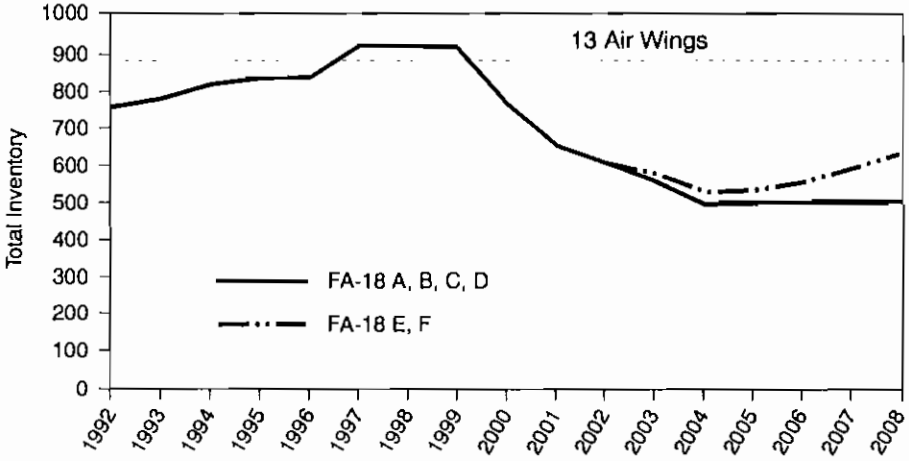
The Navy has already altered a significant number of its plans, some voluntarily and others not, in order to save money. Yet in spite of naval aviation's attempt over the last decade to modernize in nearly every mission area, devoting billions of dollars to a host of new or modified programs, not a single new fixed-wing fleet aircraft is flying. Programs that have gone by the wayside include: the A-12 Avenger, a replacement for the twenty-five-year-old A-6E, terminated as a result of contract mismanagement and cost overruns; the Naval Advanced Tactical Fighter, the follow-on fighter for the F-14; the Advanced Tactical Support Aircraft, successor to the E-2, EA-6B, and S-3; and finally the P-7, an advanced anti-submarine aircraft intended to replace the P-3 Orion.

Attempts were also made to upgrade the F-14 and A-6, through the F-14D fighter and advanced A-6F medium attack aircraft. In the case of the F-14D, a decision was rendered as a result of high unit aircraft cost to build eighteen new aircraft and remanufacture thirty-seven older F-14s for a total of only fifty-five upgraded F-14Ds.[7] As to the A-6F, the program was scrapped in favor of "rewinging" and reworking current A-6Es as a less costly way to extend the life of the A-6E and add system improvements. The only aircraft to achieve a fully developed prototype is the Marine Corps tiltrotor V-22 Osprey, the replacement for the CH-46 medium-lift helicopter. Despite the Navy's fervent efforts to terminate the highly controversial Osprey program, and the loss of several prototypes, this expensive aircraft continually receives congressional support.[8]

Essentially, after massive effort on research and development on new tactical aircraft for the Navy, none have been procured since the FA-18, which was designed in 1975 and procured in 1979. It has been estimated that naval aviation has lost nearly $40 billion from future budgets as a result of the termination of a variety of aircraft programs. This loss alone represents the equivalent of nine hundred aircraft out of the planned acquisition of 1,500 through 1996.[9] As 1992 begins, carrier aircraft modernization rests solely on two remaining programs: the AX and the FA-18 E/F.

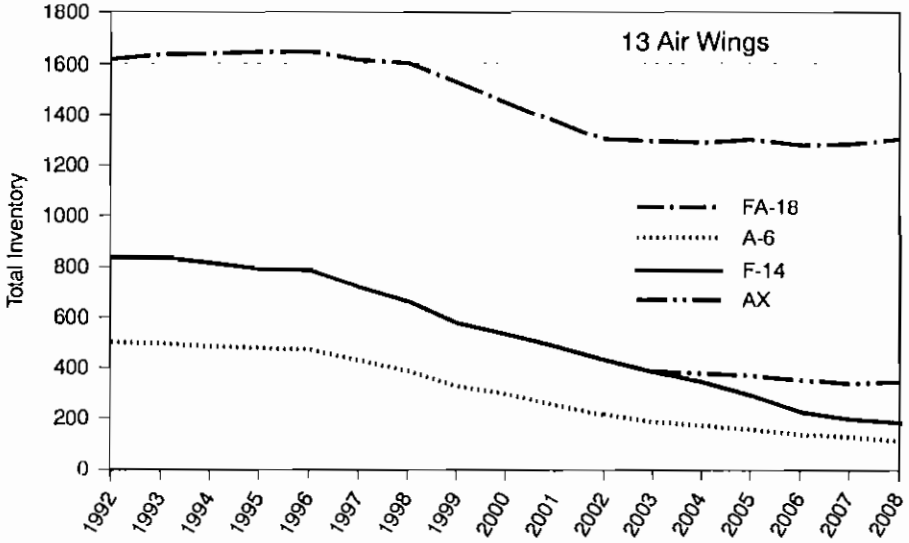
AX: The Silver Bullet? The Gulf War demonstrated that although the F-117 stealth fighter constituted only three percent of all Air Force planes in the region, these forty-two aircraft had destroyed nearly forty percent of the designated strategic targets, which left most defense analysts with the impression that stealth was worth the investment.[10] The effectiveness of stealth aircraft in striking targets in the most heavily defended areas is undeniable; when a mere forty-two of them had such a dramatic impact, however, exactly how many are necessary is open to interpretation.

In its quest to acquire a long-range, stealthy bomber, the Navy first developed the A-12 Avenger program. Shrouded in secrecy, the A-12 was ultimately



Navy / USMC FA-18 Inventory vs. Requirements

Figure 3



Navy / USMC Fighter and Attack Aircraft

Figure 4

terminated by Secretary of Defense Richard B. Cheney for a myriad of reasons. Ultimately, the Navy was left with nothing, after billions had been spent. By April 1991 the Navy, still seeking to find a medium-attack replacement for the A-6E, had adopted a novel approach to the same problem, a futuristic aircraft known as the AX. The new design would be stealthy, through low-observable engineering, but

would have less range and carry less ordnance than the A-12 and in all probability cost more because of its delayed conception and procurement. Whether or not the AX would serve as a fighter in addition to its strike role has been a subject of debate. In the quest for more multi-role aircraft, there is a strong consensus that the AX should be made capable of performing both strike and fighter missions. Design engineers have pointed out that such multi-mission flexibility is well within the realm of design, though with the predictable consequence that the aircraft would be considerably more expensive.[11]

The costs of development and procurement of the AX are being incurred simultaneously with those associated with the FA-18 E/F. Whether touted as a single-mission aircraft or supersonic strike-fighter, the AX is an extremely expensive "paper aircraft" at a time when funding competition has reached an unprecedented level. The House Appropriations Committee report on FY 1992 defense appropriations estimates research and development (R&D) costs alone at $13 billion;[12] Pentagon sources claim AX R&D is very likely to require $16 to $18 billion.[13] In May of 1991, Navy officials estimated that the entire cost of development and procurement of 575 AX aircraft (the Navy's original goal) would be $86.3 billion dollars in FY 1991 dollars.[14] The unit cost per aircraft was originally estimated at $100 million for a high rate of production and $160 million if a lower production rate were selected.[15] Adjusted for inflation, the entire AX program cost could well exceed the Navy's entire budget for one entire year if procurement of so many aircraft are attempted. Is the added capability worth the expense? Moreover, are so many stealthy aircraft required?

Before the advent of anti-radiation missiles, cruise missiles, and the B-2 bomber, a vehicle like the AX could have been justifiably required for retaliatory strike missions such as those flown into Libya and Syria. Since both the B-2 (if in small numbers) and Tomahawk now already exist, and the AX does not, it is logical for future missions of a limited scope against high-risk targets to employ those weapons.

The continued use of carrier aircraft against targets with lower associated risk remains a viable option. As long as the U.S. perseveres in maintaining a technological edge over Third World defenses, through electronic jamming, high-speed anti-radiation missiles, and stand-off attack weapons, there is no clear urgency to procure a new weapon system that would draw resources away from so many other pressing needs. While the AX represents the wave of the future where stealth is required for survivability, the necessity for large numbers of stealthy aircraft has not been made immediate by potential adversary advances. Research and development efforts should continue to a limited degree and the program paced to accord with an emerging threat more distant in time. Already, funding the AX research and development has been halved for the next five years, which will most likely delay fleet introduction to 2010 if not later.

In light of the limited number of B-2 aircraft that are to be procured, the AX could very well serve both the Navy and the Air Force as a joint venture if the two services were to agree on requirements. In need of replacement for the F-111, F-15E, and F-16 aircraft, the Air Force realizes the benefits of a joint program fulfilling the needs of both services.[16] In the past, the F-4 Phantom and the A-7 Corsair met the requirements of both, each service adding slight modifications to accommodate specific needs. Since economies of scale are reached only when a large number of aircraft are procured, the higher production run of a joint-service aircraft would benefit both services, fulfilling their needs for a stealthy bomber having some inherent fighter capabilities; neither service alone will have the funds to acquire such an aircraft.

The F-117 proved in the Gulf War that a very few aircraft can have a dramatic impact upon the most challenging targets. In the Navy's quest to replace the A-6E Intruder, it should realize that a one-for-one replacement is not required if the follow-on aircraft will accomplish missions more effectively and with fewer aircraft. The AX should be pursued primarily as a modernization effort as opposed to a medium-attack aircraft replacement program. In turn, much fewer than 575 aircraft are needed to meet future requirements, since the capabilities of the AX will far exceed the 1980s technology of the F-117.

For the Navy, acquiring the AX on a limited budget in the near future would be analogous to putting an addition on a home that already has a gaping hole in the roof; the new space would be nice to have, but the pressing need is to fix the roof. Filling the air wings of existing carriers is the Navy's "hole in the roof"; it needs fixing, it is not improving on its own, and it will probably cost more to repair than originally estimated by the contractor. If naval aviation is to remain a vital force, sound investment decisions must be made in the near term that result in aircraft procurement congruent with the other urgent needs of the naval service.

FA-18 E/F: Filling the Gap in the Charts. As a means to increase the number of strike aircraft on each carrier, upgrades to the F-14 to give it a strike role were considered but ultimately rejected in favor of new versions of the FA-18 (i.e., the FA-18 E/F). It was felt that the need to fill the future strike gap could best be met with improvements to the Hornet, whose inherent mission flexibility, systems growth potential, and increased range compared to its predecessors (the FA-18's A, B, C, and D models) would make it effective in the twenty-first century. Although the FA-18 E/F will have neither the range of an A-6E (or the AX, for that matter) nor some of the outer-air-battle attributes of the F-14, it will be able to perform a variety of missions beyond the capabilities of either. Since the "E/F" version is not markedly different from previous FA-18s, the program has much less risk than the A-12 or AX.

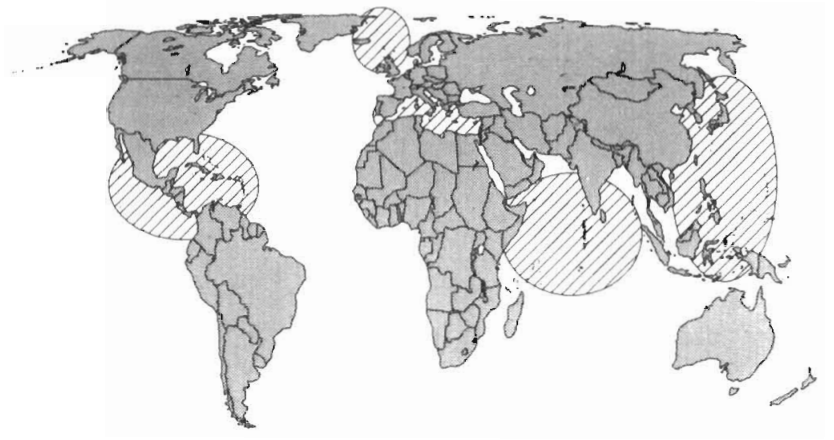
With a concentrated effort and enough dollars, there is little doubt that the FA-18 E/F program can be executed. Analysts familiar with budgetary requirements and limitations point out that a twenty-five-percent reduction in ships and aircraft carriers would provide adequate fiscal relief to bring both the AX and FA-18 E/F programs to fruition.[17] In February 1992, a Pentagon source revealed that the low rate of initial production for the FA-18 E/F will cost nearly $180 million per aircraft for production of the first twelve aircraft, which was $110 million more per aircraft than had been previously anticipated. If the FA-18 E/F program is executed, this $1.3 billion overrun will undoubtedly be recovered from various programs already earmarked to receive money in the previous budget.[18]

If the AX and FA-18 E/F are to lead the way for modernization efforts in naval aviation in the twenty-first century, they are both on collision courses with the cost of maintaining a capable and ready fleet of 450 ships. The ability to project highly accurate weaponry worldwide from stealthy platforms will be nothing more than an idle wish if drastic and sweeping reforms are not enacted; but this dimension of striking power, never before realized, is technologically feasible and available if innovative, fundamental changes are undertaken in the 1990s. If the carrier force is to remain a viable tool of national defense and be the focal point of naval power, there are some practical measures by which much-needed aircraft modernization can be accomplished within new budget constraints.

Future Aircraft Are the Catalyst. The most immediate and obvious solution to shortfalls in aircraft inventories would be a reduction in the number of operational air wings. Had the number of deployable carriers been reduced in the 1993 budget, a corresponding cut in air wings would have followed. Currently, the modernization and procurement needed with twelve carriers and eleven active wings cannot be accomplished while maintaining the status quo in force structure. If additional funds are not allocated to the Navy, a force of diminished capability will inevitably result in any case, or deeper cuts in the current force structure will be required in order to preserve aircraft modernization and procurement efforts. I suggest we get rid of some force structure to go ahead with modernization.

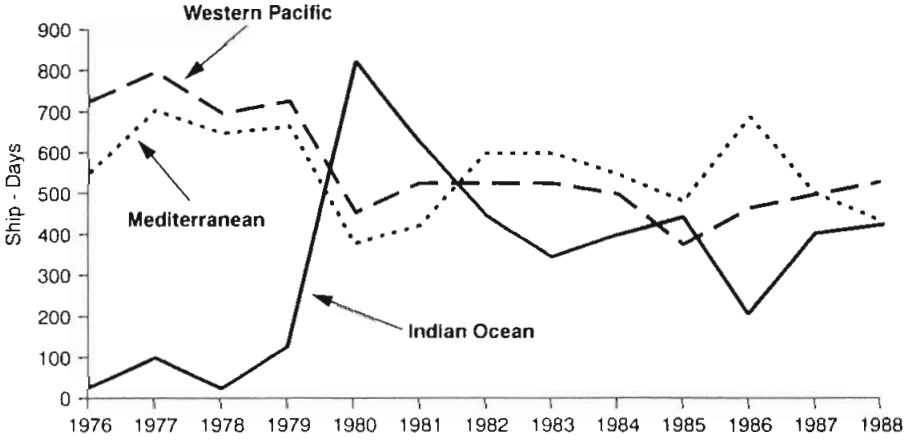
Reductions should be systematic, purposeful, and balanced. What specific effects, then, would having fewer air wings (and proportionately fewer carriers) have on the Navy?

- Aircraft procurement could be realigned to meet future requirements realistically.[19] Previously earmarked procurement funds could be redirected to accelerate modernization and R&D. Due to inflation, even with optimal use of available dollars, the longer procurement or R&D programs are extended, the more costly they will become.



U. S. Naval Forces "Deployment Hubs"
Figure 5

Source: "America's Carrier Battle Groups: Lasting Requirements in a Period of Global Change," ACNO Air Warfare 3-91



Annual Carrier Ship - Days Deployed
Figure 6

Source: Siegel, Dornabyl, Lingberg, "Deployments of U.S. Navy Aircraft Carriers and Other Surface Ships, 1976 - 1988," Center for Naval Analyses, CIM 51, July 1989, p. 11.

- The goal of increasing the number of strike-capable aircraft per carrier from forty to sixty would be much more feasible.
- Aircraft for which critical shortages are predicted could be placed in preservation for use later. We are doing this now with the E-2C Hawkeye because of the acute shortage foreseen for this type of aircraft. Fewer air wings would create in the near term an excess of aircraft that could be "mothballed,"

which in turn would create a grace period during which replacement aircraft could be produced.

- Reductions in personnel associated with cuts in carriers and air wings could save billions of dollars over the long term; personnel costs constitute nearly one-third of the annual Department of the Navy budget.[20] Additionally, much-needed training ordnance and stand-off weapons, otherwise vulnerable to cancellation, could be preserved.
- Efforts to develop the Advanced Tactical Support aircraft might be resurrected to meet vital needs currently being neglected as a result of underfunding.
- Having fewer air wings on fewer deployable carriers means fewer support ships and, in turn, a smaller supporting infrastructure.

Arguably, with fewer air wings and aircraft carriers the national strategy would suffer as a result of diminished forward presence. Are carriers, however, truly the pivotal focus of forward presence, or has a certain amount of myth and outdated tradition clouded the actual need for continual deployment of a specific number of carriers? How, then, is forward presence most effectively accomplished?

Rethinking Deployment Philosophy

Armed forces can serve as an effective means of achieving foreign policy objectives through their potential, as well as actual, use. The idea that the judicious dispatch of armed forces can delay unfavorable developments and thereby provide a window of opportunity for diplomatic crisis resolution, influences their deployment, in particular for naval forces. Since the mid-1970s, deployment of carrier battle groups on a continuous worldwide basis has become an established U.S. naval practice.

Specifically, the unified commanders in chief (CinCs) of the various world areas of responsibility have operated for years without fiscal accountability by placing financially unwieldy demands on the Navy's carrier forces. The CinC's job is to be prepared for any contingency in his area, and continual carrier coverage, whether actual employment is specifically envisioned or not, has traditionally been a convenient method of doing so. Of course the Navy is charged with paying for the service provided. The Indian Ocean has recently received the most attention, with a continual commitment of one carrier on station since the cessation of hostilities in the Gulf. Elsewhere, fluctuating numbers of carrier battle groups have been sent to "deployment hubs" (Figure 5) worldwide to fulfill the role of forward presence.

Since 1980 the Navy has attempted, with varying degrees of success, to keep at least one carrier deployed to the three dominant "hubs," the Mediterranean, Western Pacific, and Indian Ocean.[21] Studies often cite the number of annual "carrier-days" spent in various parts of the world (Figure 6). Nevertheless, as

convincing as such statistics might be, the upshot is that even with fifteen deployable carriers, as the Navy had in 1990, not all "deployment hubs" are served continuously. In reality, most carriers "deployed to" the Western Pacific are often in transit to the North Arabian Sea or Persian Gulf, yet are credited with days in that region while either in transit or tied to the pier in a Western Pacific home port such as Yokosuka, Japan. Although the North Atlantic is an acknowledged "deployment hub," and formerly many war plans centered around a confrontation with the Soviet Union in those waters, carriers actually deployed to the North Atlantic for an average of only twenty-eight days per year between 1976 and 1988. In some years the total number of North Atlantic carrier-days was less than ten. Likewise, carriers have deployed in the South Atlantic an average of four days per year during the same period.[22]

Congressional analyst Ron O'Rourke demonstrates very accurately with some simple mathematics that more than fourteen carriers are required to maintain a continual presence in the three dominant "deployment hubs."[23] Factors in his calculations include carrier transit distances, typical carrier overhaul scheduling, allowances for the Navy's "personnel tempo" policy (two days home for each day on deployment), and the effect of forward-basing an aircraft carrier in Japan on deployments to the Western Pacific and Indian Ocean. The Navy itself has found that even at the zenith of carrier force levels (with fourteen or fifteen deployable carriers), it was unable to defend portions of all three oceans simultaneously. The Gulf War clearly demonstrated that a six-carrier commitment in one region (i.e., the Persian Gulf and Red Sea) may well be as large a commitment as is operationally feasible.

With the decision to reduce the force structure to twelve deployable carriers, then, that the Navy can no longer provide constant deployments to all three major traditional "hubs" is moot. The service is just beginning to explore the constraints of operating fewer carriers. A case in point is the recent replacement of the carrier *Saratoga* with the *Eisenhower* for a twenty-day exercise in the North Atlantic, in an effort to save roughly $10 million dollars by diverting the *Eisenhower* on her return from a Mediterranean deployment rather than deploy the *Saratoga* from the East Coast. In this way, one carrier accomplished what has traditionally been done with two.[24]

Redefining the Deployment Agenda. Assessment of the purpose and influence of forward presence in the absence of the former Soviet threat prompts re-evaluation of traditional naval deployment cycles and destinations. A critical purpose in the case of aircraft carriers is to signal U.S. intent to both allies and potential adversaries. Although carriers have been deployed worldwide continuously for forty-five years, their influence in crisis resolution has been subject to debate. The hackneyed expression, "When a crisis occurs the President always asks, 'Where are the carriers?'" might more usefully be phrased, "If a carrier had been

there, would it have made a difference?" More often than not, the presence of either one or two carriers has neither averted, nor significantly aggravated, a potential crisis. Acts of terrorism and anarchy are probably not appreciably affected by an aircraft carrier's presence or absence. The littoral of the Mediterranean is a prime example of an unstable region where either one or two aircraft carriers have been deployed constantly for decades. However, very few crises which have arisen in the Mediterranean since 1974 have been immediately resolved or avoided due to the presence of an aircraft carrier (Table 2). The lone exception was the *Achille Lauro* crisis which, in all likelihood, could not have been resolved without carrier air power in the immediate vicinity, since the USS *Saratoga*'s fighters were in a position to intercept and force the landing of the commercial airliner that terrorists had hijacked.

A prime example of the misapplication of naval power was the attempt to resolve the 1979-1980 Iranian hostage crisis by continually stationing two carrier battle groups in the vicinity of Iran. As William Hickman accurately points out in his analysis of the Iranian hostage crisis, "the naval presence served no useful role in resolution of the hostage crisis. For the most part, the military options presented by the presence had military or political liabilities which reduced their political effectiveness. What is intended to be a demonstration of strength and resolve may be perceived as weakness and indecision."[25] On the other hand, the most effective utilization of carrier air power as an instrument of influence in recent years may well have been that against Libya. A long buildup of pressure leading finally to a strike quieted that terrorist-sponsor state for a number of years. In most instances, it is evident that carrier presence has primarily been a political tool rather than the decisive factor in crisis resolution. How, then, should the deployment and projection of diminished carrier air power in the future be optimized to maintain protection of U.S. interests and citizens?

Moving toward a Strategy of Decreased Deployment. The vast majority of crises are not resolved rapidly, and intelligence communities will rarely pinpoint the location and timing of crises in advance. However, most do not necessitate an immediate carrier air-power response. In many instances, such as the recent unrest in Yugoslavia, it is often in the best interests of the U.S. to assume a neutral role while an intermediary such as the United Nations resolves differences between warring factions. Additionally, potential crises are no longer complicated by underlying Soviet opportunism.

Naval forces in general, and aircraft carriers in particular, must now be re-evaluated in terms of their value as a reflection of American resolve and confidence abroad. Since aircraft carriers possess an intrinsic worth in their capacity to show the flag and instill confidence in allied nations, an isolationist reversion to keeping naval force close to American shores is unpalatable if American interests are to be preserved overseas. On the other hand, the notion

Table 2
Carrier Battle Group Responses to Crises Since the Vietnam War

Year	Crisis	CVs	Year	Crisis	CVs
1974	Cyprus	2	1983	Libya-Chad	1
1975	Cyprus Unrest	1	1983	Marine Barracks Bomb	2
1975	Eagle Pull, Cambodia	1	1983	Iran-Iraq	1
1975	Frequent Wind, Vietnam	4	1983	Korea-Burma	1
1975	*Mayaguez*	2	1983	Grenada	1
1975	Lebanon	1	1983	Syria	1
1976	Kenya-Uganda	1	1984	Central America	1
1976	Korean Tree Incident	1	1984	Persian Gulf	1
1977	Uganda	1	1984	Saudi Hijacking	1
1978	Afghanistan	1	1984	Cuba	1
1978	Iranian Revolution	1	1985	U.S. Pers. in Lebanon	1
1979	China-Vietnam	1	1985	TWA 847 Hijacking	1
1979	Yemen	1	1985	*Achille Lauro*	1
1979	Soviet Troops in Cuba	1	1985	Egypt Air Hijacking	1
1979	Afghan/Iran Hostages	2	1986	OVL-FON Ops	3
1979	Park-Chung Hee	1	1986	La Belle Disco, Libya	2
1980	Korea	1	1987	Persian Gulf Ops	2
1981	Iran-Iraq War	2	1987	Hostages in Lebanon	1
1981	Syria	2	1988	Summer Olympics	2
1981	Libya	2	1988	Maldives Coup	1
1981	Sadat-Sudan	1	1989	Lebanon Civil War	1
1981	Central America	2	1989	Panama Elections	1
1982	Israeli Invasion	1	1989	China Civil Unrest	1
1982	Peacekeeping Force	2	1989	Hostages in Lebanon	2
1982	Palestinian Massacre	2	1989	Philippines	2
1983	Honduras	1	1990	Desert Shield/Storm	6

Source: Perin, David, "A Comparison of Long-Range Bombers and Naval Forces," CNA 91-2242 Working Paper, Alexandria, Va.: November 1991, p. 9.

of U.S. naval forces simply becoming part of the Mediterranean or Indian Ocean seascape and manifesting a policy of nonintervention in other nations' affairs was prevalent prior to U.S. involvement in the Gulf War; the problem is that the precedent of use of force may very well fade from the memories of hostile nations as time passes after it. As James Cable notes in his book, *Gunboat Diplomacy*, "Limited naval force is most economically implied when the mere threat achieves the objective."[26] What impact, then, might decreased deployment have on the strategy of forward deployment?

The concept of "decreased deployment," or reduction in traditional deployment activity, would have a myriad of positive implications for both the United States and nations abroad, including the following:

- Decreased deployment would create tremendous monetary savings, since fewer carriers and air wings would be needed. Studies show the annual operating and maintenance cost of a carrier battle group (CVBG) is $586 million per year if deployed for a six-month period. Interestingly enough, savings of only ten percent are realized when a CVBG does not deploy at all during a year. Only when a CVBG does not exist do substantial savings occur.[27]
- With fewer demands on it, naval aviation could commit the requisite time and money to development of next-generation aircraft.
- When a crisis occurs, carrier forces would be employed as they had been under the scheme of constant deployment. However, instead of responding immediately to every crisis, the United States could selectively signal potential adversaries that the situation was serious enough to warrant carrier presence. Selective crisis response in matters of paramount concern to the U.S. would evoke a clear sense of substance and credibility. Conversely, when a carrier steams a short distance to a crisis simply because nothing else is going on, with no intent to intervene, the wrong psychological message is sent.
- Decreased deployment which involves a less visible carrier presence may prove more conducive to diplomatic solutions than cornering or badgering a nation with carriers that happen to be in the area. The fact that two carriers were already in the Mediterranean during the 1970 Jordanian crisis in all probability had much less impact than did the announced movement of a third from the Atlantic toward the Mediterranean.
- Decreased deployment could ease the constant pressure to meet deployment dates and permit more meaningful training both in the United States and abroad. If the forward-deployed time was cut twenty-five to fifty percent, depending on transit distances to some theaters, the Navy could be much more flexible in scheduling commitments with allies. Being in the right place at the right time has always been a shell game of sorts no matter how many carriers have been deployed at any one time. When crisis resolution does involve carriers, it will be largely immaterial whether they find themselves in the vicinity of a crisis at the outset or at some great distance. The true measure of future effectiveness for carrier air power will be the degree to which it is useful as a significant political tool, a force augmenter, a vehicle of power projection, and an instrument of sea control.

Carrier Force Structure Options. In the current budget environment, overshadowed by the prospect of even lower funding levels in the future, some plan that incorporates a smaller deployable carrier force will likely become inevitable. Also, as has been demonstrated mathematically, a dozen carriers cannot accomplish a constant three-ocean presence without a negative impact upon personnel tempos. Adoption of "decreased deployment" versus a constant

forward-presence strategy would require fewer ships and represents a realistic, attainable alternative.

A new carrier force structure must accommodate a variety of factors. The Navy's plan (Figure 7) and the transitional, or interim, plan of Table 3 contrast two approaches to future carrier force structuring.

From Fossil Fuel to Nuclear Power

The large-deck nuclear carrier, with its ability to create wind over the deck rapidly to land aircraft, steam at high speeds across vast distances without refueling, and operate at a fraction of the operating and maintenance expenses of conventionally-powered carriers, has proven its superiority to fossil-fueled ships. In the 1960s it was predicted that a nuclear carrier would have a life span of roughly thirty years and that the nuclear fuel would last for about fifteen. Today this same carrier has an expected life span of from forty-five to fifty years and a nuclear core life of twenty-three.[28] The initial cost of the *Nimitz*-class carrier was thirty percent more than that of its conventional counterpart would have been (although fossil-fueled carriers are no longer built), because of the nuclear power plant. Because so much is recovered in lower operating and maintenance expenses with a *Nimitz*-class carrier, however, total life-cycle costs of nuclear carriers are nearly identical to those of conventional carriers after thirty years of operation for both types.[29]

The only exception has been the nuclear carrier *Enterprise*. Construction was begun on the *Enterprise* in early 1958, with commissioning taking place in 1961.[30] The only ship of its class, the *Enterprise* could be described today as simultaneously unique and antiquated in its engineering design, with a total of eight nuclear reactors compared to the *Nimitz*-class carrier with two. Accordingly, the *Enterprise* requires more personnel than the *Nimitz* in both its reactor and engineering spaces. The engineering and the reactor departments of the *Enterprise* employ a total of 250 more personnel than those of a *Nimitz*-class carrier. Moreover, engineering skills learned on the *Enterprise* are not readily transferrable to a *Nimitz*-class carrier, since its propulsion plant layout is unlike any other nuclear carrier. The *Enterprise* has also been notorious for consuming a disproportionate share of ship repair funds. Between 1982 and 1989, the *Enterprise* required 57,000 man-days for repairs as compared to 29,000 for the *Ranger* and 24,000 for the *Carl Vinson*. At an estimated $500 per hour, this amounts to $132 million more to maintain the *Enterprise* than the *Carl Vinson* over an eight-year period.[31]

Before the announcement of the cutback to a twelve-ship carrier force, the decision was made to refuel rather than dismantle the *Enterprise*, extending its service life by twenty years. At a total price of $2.15 billion, the four-year refueling was approximately thirty-percent complete in early 1992. The cost of the project (which includes combat systems upgrades) has already exceeded

original estimates by $124 million. After repairs amounting to almost sixty percent of the cost of a new carrier, the *Enterprise* will still be more expensive to maintain than other carriers, if its previous record is a reliable indicator. Opponents to scrapping the *Enterprise* argue that since a nuclear carrier has never before been dismantled, and since estimates for doing so are in the vicinity of $600 million versus $60 million for a conventional carrier, it is easier to continue overhaul of the power plant than tackle the problem of dismantlement (which will eventually have to be done in any event).[32] This near-sighted approach will undoubtedly cost the Navy over the long run, in maintenance and repair costs for a ship that is a greater burden fiscally than it is worth operationally.

The luxury of a forward-deployed carrier in Japan eases both transit distance problems and presence requirements for the Indian Ocean. Since the early 1970s, the United States has kept a carrier and a variety of other combatants homeported in Yokosuka, Japan. This arrangement has been beneficial for both nations. For the U.S., forward presence and alliance relations are satisfied through the arrangement; in addition, the Japanese pay for fifty percent of the carrier's ship repair work in port, as of 1992, and will increase payments to one hundred percent by 1995.[33] Japan benefits through lower defense requirements and an enhanced sense of security from her surrounding Asian neighbors, whom the Japanese have traditionally not trusted. In 1991, the *Independence* replaced the *Midway* as the Japan-based carrier. A conventional carrier whose service life extension (SLEP) was completed in 1988, the *Independence* was a logical choice for Japanese duty. It is expected that the *Independence* will stay in Japan until at least 1997, when it is scheduled to be decommissioned. Its likely replacement would be the *Constellation*, another conventionally powered carrier currently in overhaul for service life extension in Philadelphia. Although basing a nuclear carrier in Japan would enhance U.S. carrier capabilities overseas, such a move would probably be met with extreme opposition by the Japanese public and government. For this reason, keeping one active conventional carrier (other than the training carrier) in the U.S. inventory is logical as long as the option of forward basing in Japan remains.

Advance money was included in the 1993 presidential budget for the ninth *Nimitz*-class carrier, CVN 76, which will be built in Newport News Shipyard by the Tenneco Corporation. The new carrier is scheduled to begin construction in 1995. CVN 76 would inevitably replace an aging conventional ship and is in fact needed if a dozen carriers are to constitute the force for the future. Proponents of CVN 76 argue that the industrial base must be maintained so that skilled labor will not have been needlessly lost if the nation is required to build carriers in the distant future. The same argument could apply to the construction of nuclear submarines, yet the Seawolf attack boat may be cancelled after the first vessel is launched, costing many technically skilled laborers their jobs. Too many technical projects have been terminated with the defense department to

Table 3
Transitional Carrier Plan

Current Carrier Force 1-92 Total 14	Transitional Force Total 11	Final Force 2000 Total 10	Reconstitution Force Total 5
AVT 59	CV 62 [1]	CV 64 [2]	AVT 59
CV 60 (Retire)	CV 63	CVN 68	CV 62
CV 61 (Retire)	CV 64	CVN 69	CV 63
CV 62 [1]	CVN 68	CVN 70	CV 66
CV 63 (Recent SLEP)	CVN 69	CVN 71	CV 67
CV 64 (Recent SLEP)	CVN 70	CVN 72	
CVN 65 (Refuel?)	CVN 71	CVN 73	
CV 66 (Retire)	CVN 72	CVN 74	
CV 67 (Retire)	CVN 73	CVN 75	
CVN 68	CVN 74	CVN 76	
CVN 69	CVN 75		
CVN 70			
CVN 71			
CVN 72			

Note [1]: Based in Japan Note [2]: Possibly to replace CV 62 in Japan
SLEP—Service Life Extension Program

cite saving the industrial base as a reason for building another carrier. The underlying reason for building CVN 76 should be to replace an older conventional carrier so that long-term costs are held down while a smaller, more efficient carrier force is maintained. Since the *Nimitz*-class carrier and her sister ships require refueling at the turn of the century, the idea that carrier-related work will not exist is incorrect. The fact of the matter is that funds are more sorely needed for aircraft than for maintaining the carrier industrial base to provide employment. The need for more carriers after CVN 76 will simply not arise for some years.

A smaller, more affordable carrier force structure centered around one efficient class of carrier is logical if the Navy must operate in a fiscally constrained environment in the future. With nine nuclear carriers of the *Nimitz* configuration, standardized training and operations and minimized repair and maintenance costs could be realized. Working with ten total carriers (one conventional ship in Japan), the Navy would have the capability to meet a regional contingency, as it did in the Gulf War with six carriers, and still have additional carriers to sustain minimal operations before and after a conflict. It must be realized, however, that carriers are not the main issue: the main issue is whether the Navy can field enough modern, capable aircraft to place on its carriers, both existing and future, for the welfare of the Navy at large.

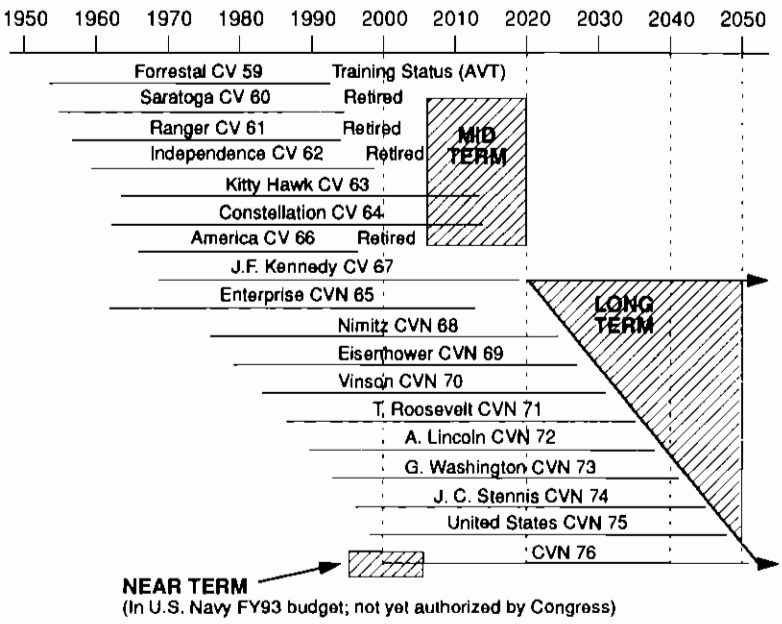
Critical Steps and Harsh Realities

The dilemma the United States faces in funding a strong navy in 1992 is reminiscent of Great Britain's situation in 1815. For the majority of the nineteenth century, Great Britain was the world's only great power, in that it had global interests and the ability to project power on a worldwide basis. Having just completed and won a series of wars against the world's largest continental power, France, the British electorate was unwilling to continue high defense spending. However, the nation had been thrust into a position as the dominant world power, with the British people expecting both their homeland and vast colonial possessions as well to be protected. How, then, did the British accomplish their security objectives?

First, the British maintained their technological edge. They fostered a strong foundation for research and development that produced breakthroughs in metallurgy and propulsion. While the British were not the originators of every related technological development, they were usually in a position to adapt and implement new innovations much more efficiently than rival nations. Second, the British maintained a strong defense industrial base in order to increase their naval power if necessary, capably and rapidly. Third, the British continually maintained a fleet that was vastly superior in design to any of its potential adversaries. Finally, British seamanship skills and levels of readiness, whether under sail or steam, were unparalleled in the fleets of other countries.[34] For several decades no other nation on earth was in a position to challenge England's fleet.

Nearly two hundred years later, after soundly defeating Iraq's military and winning the expensive, lengthy Cold War struggle with another continental power, the Soviet Union, the United States finds itself in a similar position. With global economic commitments, an industrial base capable of producing the most advanced military equipment, and the world's most powerful military, the U.S. too faces the need to reassess its role as the dominant world superpower. Likewise, the U.S. Navy must reevaluate its role in national defense. The United States has already taken two critical steps that many world powers have been reluctant to embark upon: first, building and maintaining a powerful navy, and second, gathering the resolve actually to use naval force in pursuit of national objectives.[35] The Navy must recognize and treat both the changed budget climate and evolving regional threats as catalysts for transformation rather than impediments to progress. Lingering adherence to a large force structure, as if for tradition's sake, will undoubtedly weaken the Navy and jeopardize national security.

In the last forty-five years, the Navy has yet to commit more than six carriers to a major conflict simultaneously. Although protracted conflicts such as Vietnam and Korea employed fifteen and seventeen carriers, respectively, at different times, and



Current Navy Carrier Force Structure Plan

Figure 7

Source: "U.S. Navy, Carrier Evolution Plan," Naval Institute *Proceedings*, January 1992, p. 101.

Desert Shield and Storm involved nine in all, the present perceived need for twelve or more is being driven not by calculating how many carriers are required to combat future regional threats, but by the Navy's commitment to forward deployment. In other words, the current force structure is no longer threat-oriented, as it was in the past. During the era of Secretary of the Navy John Lehman, building additional carriers was justified by the existence of a strong Soviet maritime threat. In the absence of another naval rival, the Navy has been forced to "hang its hat" on forward presence and crisis response. Given all this, the Navy is correct in its assessment that it does not have enough carriers to fulfill a constant three-ocean forward presence mission, since to do so requires roughly fifteen ships. Yet on the other hand, it appears to have an excess of carriers if a regional conflict requires no more than six or fewer simultaneously (taking into account some level of commitment preceding and following a conflict).

Although forward presence is one of the tenets of the national strategy, the Navy and the unified commanders in chief have yet to realize there is no firm requirement that aircraft carriers accomplish the bulk of this mission. Nowhere is it written that the Navy must maintain a certain number of carriers in a specific number of oceans. Much of the present level of commitment for aircraft carriers stems from obligations generated by traditional methods of forward presence. In reality, the Navy could

fulfill its roles of presence and crisis response by deploying an assortment of naval combatants, arranged in a variety of ways to various regions of concern.

Historical precedent and the lack of a significant naval threat aside, the Navy is currently not in a position to fund a large fleet for the role of forward presence. Although it is attempting to the best of its ability to fund twelve deployable carriers, the harsh reality of the situation is that the Navy is a service of diverse specialties, each facing fiscal demands similar to those of naval aviation. From an economic standpoint, twelve carriers with eleven modern, well-armed air wings are affordable only if sacrifices are made Navy-wide or if the Navy's share of the defense budget is larger than those of the other services. Assuming the Navy receives in future years roughly one-third of the defense budget, in the vicinity of $75 to $85 billion per year, maintenance of the presently foreseen twelve-carrier complement with eleven active air wings will become impossible in the face of inflation and modernization. If forward deployment can be realistically justified and an increased regional threat identified, fiscal relief might be forthcoming sufficient to finance twelve carriers and continue the much-needed aircraft modernization and procurement. This, however, will simply not be the case in light of changes that have occurred on both the domestic and international fronts.

The Navy is at the critical juncture of having to decide exactly what must be sacrificed to maintain the integrity of the institution. A passage in the *Fleet Marine Force Manual* has relevance to the Navy's current dilemma: "Finally, since all decisions must be made in the face of uncertainty and since every situation is unique, there is no perfect solution to any battlefield problem. Therefore, we should not agonize over one. The essence of the problem is to select a promising course of action with an acceptable degree of risk, and to do it more quickly than our foe. In this respect, a good plan violently executed now is better than a perfect plan executed next week."[36]

With fiscal reality rather than naval tradition as a guide, there are some critical steps the Department of the Navy *must* make to relieve current and future monetary shortfalls while preparing for a changed threat.

- Reducing the number of deployable carriers to a maximum of ten, depending on continued good relations with Japan. If maintaining a carrier in Japan is not fiscally or politically feasible, the number of carriers must be reduced to the nine nuclear *Nimitz*-class ships.
- Procuring enough aircraft with the most up-to-date capabilities to fill the decks of a reduced carrier fleet.
- Terminating the *Enterprise* refueling.
- Cancelling one of two new major aircraft programs in order to allow some measure of force modernization to occur.
- Shutting down naval air stations as consistent with a smaller number of deploying air wings.

- Substituting Navy assets other than aircraft carriers for forward deployment and crisis response.
- Concentrating on continuing to improve fleet training and readiness levels.
- Reducing the total number of personnel Navy-wide to a level consistent with fewer deployable ships.
- Maintaining research and development, and procurement, for the most promising ventures.

If there is a lesson to be learned from the British early in the last century, it should be that the foundation for British world power proceeded from pillars of strategy identical to those the United States is striving to maintain in the post-Cold War era. For the conservation and well-being of its forces, naval leadership must reassess and redirect its efforts within the new international environment much as the British did after 1815. Neither the evolving threat nor the stringent budget environment are comparable to our own navy's past experiences. Global power in pursuit of national interests is not to be found in sheer numbers of naval combatants. A modern, scaled-down navy with the greatest probability of success against the most formidable foe must be the goal of carrier air power into the twenty-first century. America's security and future success will in part depend on the nation's ability to project power effectively on a worldwide basis. As did the British, the U.S. Navy must now put its energy into maintaining and nurturing a superior force, adapting future technologies to the fleet, and sustaining a viable industrial base.

The challenges the peacetime Navy faces as it enters the twenty-first century have never been so extreme, nor has the opportunity to redefine the ways by which to accomplish its mission ever been greater. Naval leadership must seize the opportunity to set a bold new course that best preserves the unique capabilities inherent in carrier aviation. Preservation of this valuable facet of American defense is of paramount importance if the United States is to remain the world's superpower.

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